

COURSE DESCRIPTION
INTERMEDIATE DIFFERENTIAL EQUATIONS
MA 454/554–2D
SPRING 2024

DEPARTMENT OF MATHEMATICS
UNIVERSITY OF ALABAMA AT BIRMINGHAM

Course Instructor: Rudi Weikard
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Office Hours: TT 11:00 am – 12:00 noon and by appointment

Meeting times: TT 12:30 pm — 1:45 pm
Meeting location: UH 2007
Prerequisite: Grade of C or better in MA 252 or equivalent
Credits: 3 semester hours
Textbook: *Differential Equations: a Modern Approach* by Harry Hochstadt,
Dover, 2012.
Canvas: <https://www.uab.edu/elearning/canvas/>

Important dates:

First day of classes: January 8
Martin Luther King Holiday: January 15
Last day to Drop/Add: January 16
Midterm exam I: February 22
Spring Break: March 10 – 16
Midterm exam II: April 11
Last day of classes: April 19
Final exam: April 25, 10:45 am – 1:15 pm
Grades available online: May 1

Methods of teaching and learning:

- 28 class meetings of 75 minutes consisting of investigations and discussions of concepts, examples and problems. Time for two in-class tests is also included.
- Students are expected to undertake at least 8 hours of private study and homework per week.

Date: December 28, 2023.

Aims of the course:

The course aims for students to attain *conceptual understanding* and *procedural fluency* with regard to the following items:

- existence and uniqueness questions of solutions of systems of differential equations;
- linear systems of differential equations, in particular those with constant and periodic coefficients;
- boundary value problems, in particular the Sturm-Liouville problem;
- the concept of stability in the investigation of the qualitative behavior of two-dimensional systems;
- important concepts from analysis.

Conceptual understanding is demonstrated by the ability to solve pertinent problems related to that concept, even if these problems were not explicitly covered in class. *Procedural fluency* is demonstrated by exercising routine problems in an assured and timely fashion.

The course also emphasizes *critical thinking* and *communication skills*, both written and verbal.

Course content:

- Systems of linear differential equations
- Boundary value problems
- Existence theory
- Two-dimensional autonomous systems

Assessment procedures:

- Student achievement will be assessed by the following measures:
 - Frequent unannounced quizzes based on previously assigned homework and contributing 20% to the course average. Many problems on tests are modeled after homework problems. Staying on top of homework is therefore extremely important.
 - Two 75-minute exams in class. Partial credit is awarded where appropriate. Each test contributes 20% to the course average.
 - A 150-minute comprehensive final examination. The final contributes 40% to the course average.
- Your course performance is the maximum of your course average and your final exam grade (each is a number between 0 and 100).
- Your final grade is determined according to the following table:

Course performance:	90-100	75-89	60-74	50-59	below 50
Final Grade:	A	B	C	D	F

Students taking MA 554 will find some more advanced problems on their exams so that they can demonstrate understanding on a higher level.

Tips:

- Help is available in the Math Learning Lab (HH 202).
- By working steadily and regularly, you will increase your chances to succeed in this course.
- Remember, being a full-time student is a full-time job.

Course policies:

- Please make sure that you are able to receive e-mail through your Blazer-ID account. Official course announcements may be sent to that address. If you wish to request a disability accommodation please contact DSS at 934-4205 or at dss@uab.edu.
- The two lowest quiz grades will be dropped to account for any missed assignments due to illness or any other circumstance.
- If a test is missed due to a serious verifiable circumstance or official university business, the test grade will be replaced with the properly rescaled final exam score. You have to advise the instructor of such circumstances at the earliest possibility.
- You are allowed to use your book and notes for any of the exams but not for the quizzes.
- Class attendance is expected. If you need to leave class early, it is polite to tell the instructor before the class starts.

Disability Support Services

UAB is committed to providing an accessible learning experience for all students. If you are a student with a disability that qualifies under the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act, and you require accommodations, please contact Disability Support Services for information on accommodations, registration and procedures. Requests for reasonable accommodations involve an interactive process and consist of a collaborative effort among the student, DSS, faculty and staff. If you are registered with Disability Support Services, please contact me to discuss accommodations that may be necessary in this course. If you have a disability but have not contacted Disability Support Services, please call (205)934-4205 or visit <http://www.uab.edu/dss>.

Title IX Statement The University of Alabama at Birmingham is committed to providing an environment that is free from sexual misconduct, which includes gender-based assault, harassment, exploitation, dating and domestic violence, stalking, as well as discrimination based on sex, sexual orientation, gender identity, and gender expression. If you have experienced any of the aforementioned conduct, we encourage you to report the incident. UAB provides several avenues for reporting. For more information about Title IX, policy, reporting, protections, resources and supports, please visit the UAB Title IX webpage for UAB's Title IX Sex Discrimination, Sexual Harassment, and Sexual Violence Policy; UAB's Equal Opportunity and Discriminatory Harassment Policy; and the Duty to Report and Non-Retaliation Policy.